

Description of Australian, Cape, and other Hydroida, mostly new, from the Collection of Miss H. Gatty. By Professor GEORGE J. ALLMAN, LL.D., F.R.S., F.L.S.

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(PLATES VII.-XXVI.)

A LARGE collection of Hydroida has been placed in my hands by Miss Gatty for determination and description. It consists mainly of species hitherto undescribed. The specimens have been brought together from various parts of the world; and though they are all dry, they are for the most part well preserved, and the features of most importance in the definition and systematic distribution of the species were generally determined with ease from the chitinous periderm, after this had been subjected to such treatment as would render obvious its essential morphological characters.

No record had been kept as to the depths from which the specimens had been obtained, but it is probable that they are all from the littoral region.

In order to convey an adequate idea of its habit, every species has been figured of the size of life, while such microscopical details as are necessary for a complete diagnosis are in all cases given.*

CAMPANULARIA.

CAMPANULARIA CARDUELLA, n. sp. (Pl. VII. figs. 1, 2.)

Trophosome.—Hydrostyles about $\frac{1}{20}$ of an inch in height, springing at short intervals from a creeping stolon and annulated at the distal end. Hydrothecæ cup-shaped, with tumid base and everted lip.

Gonosome.—Gonangia springing from the creeping stolon, large, oviform, with truncated summit, and with the proximal end continued into a short but well-defined peduncle.

Locality. New Zealand.

This very minute Campanularian is rendered striking by its peculiarly shaped hydrothecæ, whose outline, somewhat resembling that of a thistle-head, has suggested the specific name. While most of the hydrostyles spring directly from the creeping stolon, some may be seen arising from loops formed by short free branches of the stolon curved upon themselves.

The nature of the contents of the gonangia being indeter-

* For the drawings which represent the natural size of the species I am indebted in almost every instance to the accurate and delicate pencil of Miss Hippisley.

minable in the dried specimen, the reference of this remarkable little Campanularian to the genus *Campanularia* is of course only provisional.

The specimen was brought by Dr. Harvey from New Zealand, where it occurred growing over the surface of a seaweed, *Melanthalia abscissa*.

SERTULARELLA.

SERTULARELLA MARGARITACEA, n. sp. (Pl. VII. figs. 3, 4.)

Trophosome.—Stem monosiphonic, much branched. Hydrothecæ distant, adnate by about half their height to the stem, from which they then become strongly divergent, epicauline side ventricose towards the base; orifice with a thickened rim and with a deep sinus at its apocauline side.

Gonosome.—Gonangia springing from the angles of the ramification, ovoid, marked by wide transverse rugæ towards the summit and the base.

Locality. Straits of Magellan. On an air-vesicle of *Macrocystis pyriferæ*.

This is a delicate form, attaining a height of about 3 inches, with a very thin pellucid periderm. The gonangium develops an acrocyt, the remains of which are visible in the specimen.

SERTULARELLA CAPILLARIS, n. sp. (Pl. VIII. figs. 1-3.)

Trophosome.—Stem monosiphonic, very slender, much branched, branches giving off pinnately disposed alternate ramuli. Hydrothecæ adnate to the internode for about half their height, then becoming free and abruptly divergent; orifice with two very narrow teeth posteriorly and two broader teeth anteriorly.

Gonosome.—Gonangia springing each from a point just below a hydrotheca, pyriform, surrounded throughout their whole length by prominent annular ridges, opening on the summit by a central, scarcely elevated orifice.

Locality. New Zealand.

This species attains a height of about 3 inches, and comes near to the *Sertularella Johnsoni* of Gray, which it closely resembles in habit. It differs from it in the abrupt divergence of the free portion of the hydrothecæ and in the pyriform gonangia.

SERTULARELLA CRASSIPES, n. sp. (Pl. VIII. figs. 4, 5.)

Trophosome.—Main stem strongly fascicled, very thick, sending off a few fascicled branches, from which and from the main stem

are emitted on all sides very numerous monosiphonic twigs which carry the ultimate, pinnately disposed, alternate ramuli, whose internodes are short and thick, separated from one another by oblique joints, and each carrying a single hydrotheca. Hydrothecæ deep, free for about two thirds of their height, and narrowing towards the orifice, which is cut into four rather short and wide teeth.

Gonosome.—Gonangia elongated, oval, springing each from a point near the middle of an internode, narrowing towards the summit, which is occupied by a circular 4-toothed orifice, and gradually tapering below to the point of attachment.

Locality. Cape of Good Hope.

The species is remarkable for its thick polysiphonic stem and short thick internodes. The specimen had a height of about 3 inches, and the stem measured nearly two tenths of an inch in thickness towards its proximal end.

SERTULARELLA CUNEATA, n. sp. (Pl. IX. figs. 1, 2.)

Trophosome.—Main stem fascicled, much branched; branches monosiphonic, pinnate; pinnæ alternate, rather distant. Hydrothecæ closely set, springing singly each from a short, thick, wedge-shaped internode, to which they are adnate for about half their height, much contracted towards the orifice, which is circular and entire.

Gonosome.—Gonangia large, ovoid, much elongated, with shallow transverse corrugations but no true annulation, contracted towards the summit, which opens by a 4-toothed circular orifice.

Locality. Cape of Good Hope.

The short, thick, wedge-shaped internodes, and the long gonangia, which attain the length of about ten internodes of the pinnæ, are striking features in this hydroid. The hydrorhizal end of the specimen had not been preserved. What remained of the colony had a height of about 3 inches.

SERTULARELLA LIMBATA, n. sp. (Pl. IX. figs. 3, 4.)

Trophosome.—Stem springing from a creeping fibre, monosiphonic, simple. Hydrothecæ borne directly by the stem, each springing from a short internode, and all directed towards one side, free for about two thirds of their height, deep, narrowed towards the summit; margin of orifice produced into a broad, thin, membranous rim which is emarginate at the epicauline side.

Gonosome.—Gonangia springing each from a point just below a hydrotheca, nearly globular, with a few shallow transverse

corrugations, opening by a circular orifice, which is surmounted by an acrocyst.

Locality. Cape of Good Hope.

This is a minute but interesting species. It attains a height of about $\frac{1}{4}$ of an inch, and was found creeping over the surface of a seaweed. It is rendered remarkable by the fact that all the hydrothecæ are borne directly by the stem without the intervention of pinnæ. The creeping fibre, however, by which the colony is attached may probably be regarded as a prostrate creeping stem, and then the free portion, which carries the hydrothecæ would represent the pinnæ. The species is further distinguished by the secund disposition of the hydrothecæ, by their membranous rim, and by the nearly globular gonangia with their acrocysts.

SERTULARELLA TRIMUCRONATA, n. sp. (Pl. X. figs. 1, 2.)

Trophosome.—Stem pinnate, monosiphonic, springing at intervals from a creeping filament; pinnæ alternate. Hydrothecæ borne both by stem and pinnæ, deep, nearly cylindrical; orifice with three strong teeth, two of which are situated anteriorly and one posteriorly; hydrothecæ of pinnæ with their axis all directed towards the same side.

Gonosome.—Gonangium sessile on the side of an internode near the base of the hydrotheca, oviform, marked by shallow annular rugæ, opening on the summit by a narrow, slightly elevated orifice.

Locality. Australia.

This is a very slender and delicate form. It attains a height of about 1 inch; and is characterized by its deep, nearly cylindrical hydrothecæ with tricuspid margin and secund disposition, and by its large, broadly oviform, and narrow-mouthed gonangia.

SERTULARELLA TROCHOCARPA, n. sp. (Pl. X. figs. 3, 4.)

Trophosome.—Main stem monosiphonic, and carrying pinnately disposed ramuli with every internode supporting two alternate hydrothecæ. Hydrothecæ rather wide, adnate for about two thirds of their height to the internode; orifice with two long acute teeth on the apocauline and a single wider tooth on the epicauline side.

Gonosome.—Gonangia springing each from a point just below a hydrotheca, amphora-shaped, surrounded from base to summit with very regular, close-set, annular ridges, and terminating

distally in a funnel-shaped tube which bears the circular even orifice.

Locality. Bass's Straits.

This species attains a height of about 2 inches. The gonangium is a beautiful object, with its strong and regular annular ridges and terminal funnel. Its resemblance to a boy's top has suggested the specific name.

SERTULARELLA DIFFUSA, n. sp. (Pl. XI. figs. 1, 2.)

Trophosome.—Colony much branched; stem monosiphonic, giving off alternate branches which repeat the ramification of the main stem; main stem and branches jointed at distant intervals. Hydrothecæ adnate to internode for about half their height, then strongly divergent and slightly tapering to the orifice, which is bidentate; two pairs of hydrothecæ borne by an internode; widely separated, and with a somewhat secund disposition on the principal branches, more closely set and bilaterally disposed on the ultimate ramuli; main stem destitute of hydrothecæ.

Gonosome not known.

Locality. Rockaway.

The present species attains a height of more than 9 inches. Its habit, with its long flexuous stems and profuse ramification, is strongly suggestive of certain long-stemmed Campanularidans, such as *Obelia longissima* of the European shores. One of its most remarkable characters is found in the presence of more than one pair of hydrothecæ on each internode, a character in which it shows an approximation to *Thuiaria*; while the constancy of the number of hydrothecæ borne on an internode, and their freedom for a great part of their height from coalescence with the internode, offer features more in accordance with the characters of the genus to which it is here referred.

DIPHASIA.

DIPHASIA BIPINNATA, n. sp. (Pl. XII. figs. 1, 2.)

Trophosome.—Stem monosiphonic, pinnate, pinnæ alternate. Hydrothecæ exactly opposite, deep, tubular, adnate to the internode for about two thirds of their height, then abruptly diverging, emarginate at epicauline side of orifice, where they give attachment to a valve-like lid.

Gonosome.—Gonangia (in female) large, springing by a narrow base from a point in the mesial line just below each pair of hydrothecæ, gradually widening upwards and terminating distally

in a marsupial chamber enclosed by four elliptical valve-like segments.

Locality. Cape of Good Hope?

This is a fine species, and attains a height of 3 inches*. The pinnæ towards the distal ends of the stems are generally the longest, and are themselves usually pinnate, thus giving to the hydroid a richness of ramification which is rendered still more striking by the profusion of large, flower-bud-like gonangia which are carried along the front of the pinnæ.

In the young female gonangia before the marsupial chamber is closed in, the orifice of the gonangium may be seen on the summit of a central conical process surrounded by the four young lanceolate marsupial segments.

SYNTHECIUM.

SYNTHECIUM RAMOSUM, n. sp. (Pl. XII. figs. 3, 4.)

Trophosome.—Colony. Stem monosiphonic, much and irregularly branched, pinnate throughout; pinnæ opposite, equidistant. Hydrothecæ deep, tubular, borne both by stem and pinnæ.

Gonosome.—Gonangia ovate, with the shorter to the longer diameter at about 1 to $1\frac{1}{2}$, strongly annulated, with the annular ridges discontinuous where they meet a zigzag line on opposite side of the gonangium, opening by a short tubular prolongation of the summit.

Locality. Tauranga, New Zealand.

Syntheticium ramosum attains a height of 6 inches. It is the second well-determined species of the beautiful genus *Syntheticium* †. From *Syntheticium elegans* it differs by its greater height and branching habit, and by the more globular form of its gonangia, which in *Syntheticium elegans* are considerably more elongated, the transverse diameter being to the longitudinal in that species as about 1 to 2.

* A small specimen has been selected for the figure.

† Heller (Zoophyten und Echinodermen des Adriatischen Meeres, 1868, p. 35, pl. i. figs. 5, 6) describes, under the name of *Dynamena tubulosa*, a hydroid from the Adriatic which can scarcely be regarded otherwise than as a species of *Syntheticium*. He, however, represents a gonangium as springing directly from the stem, and though he figures what appear to be the true gonangia in their actual relation to the hydrothecæ, he makes no reference to these in his description, thus omitting the one essential character of the genus. Altogether there is some obscurity in Heller's account, and when he tells us that the species is not rare in the Adriatic, we can scarcely help thinking that there has been some error in the location of his specimen.

These differences, however, obvious as they are, may possibly be only of varietal value, and insufficient to justify a separation of the present form from *Synthecium elegans*.

SERTULARIA.

SERTULARIA APERTA, n. sp. (Pl. XIII. figs. 1, 2.)

Trophosome.—Stems slender, monosiphonic, much-branched, with the ramification subdichotomous. Hydrothecæ exactly opposite, adnate for about half their height to the internode, and then widely divergent; aperture extending along the whole of the posterior side of the free portion of the hydrothecæ; margin deeply indented at the apocauline side, so as to present here two long sharp teeth.

Gonosome not known.

Locality. Cape of Good Hope.

This is a slender species, the colony attaining a height of about one inch, and with the habit of *Sertularia operculata*, to which it would seem to be nearly allied. It grew upon a seaweed along with *Aglaophenia chalarocarpa*, see p. 150.

SERTULARIA MINIMA, D' A. W. Thompson*. (Pl. XIII. figs. 3, 4.)

Trophosome.—Stem simple, monosiphonic, springing at short intervals from a creeping network of tubular fibres, and carrying usually from four to ten rather closely approximate pairs of hydrothecæ, which commence at some distance from the proximal end and are continued to the distal. Hydrothecæ deep, tubular, adnate to the internode for nearly their whole height, and with the apocauline edge of the aperture deeply cleft.

Gonosome.—Gonangium springing from the stem just below the proximal pair of hydrothecæ, large, widely pyriform, destitute of annulation, opening distally by an orifice raised on the summit of a very short wide tube.

Locality. Cape of Good Hope, where it occurs creeping over the surface of a rooted species of *Sargassum*.

This very minute species has been already described by Mr. D'Arcy W. Thompson from the Gulf of St. Vincent, and by Dr. Coughtrey and Mr. Bale from New Zealand and Australia. It attains a height of only one fourth of an inch, and is rendered striking by the large size of its gonangia, which are always borne singly just below the proximal pair of hydrothecæ. The creeping stolon from which the stems arise has the inner layers of its walls

* Ann. & Mag. Nat. Hist. ser. 5, vol. iii. p. 104 (Feb. 1879).

impressed with narrow, closely set, transverse constrictions which project into the cavity of the tube. The gonangia are abundantly developed in the specimen, and, as Miss Gatty has remarked to me, it is deserving of note that the *Sargassum* on which it grows is a rooted species, while on the floating *Sargassum* of the Gulf Stream *Sertularia* are rarely if ever found with the gonosome developed—a fact not without significance in connection with the invariable absence of fruit in the floating seaweed, and its presence in the rooted one.

S. minima comes very near to *S. megalocarpa*, from which it is chiefly distinguished by its wider and more extensively adnate hydrothecæ.

SERTULARIA UNILATERALIS, n. sp. (Pl. XIII. figs. 5-7.)

Trophosome.—Stem monosiphonic, slender, sending off from one side very numerous slender ramuli, which are dichotomously branched. Hydrothecæ nearly cylindrical, divergent, with the epicauline side adnate for about half its height to the internode; apocauline side of orifice deeply emarginate.

Gonosome.—Gonangia borne by the internodes just below the hydrothecæ, in the form of an inverted compressed cone whose axis terminates distally in a tubular orifice, on each side of which the edges of the gonangium are prolonged in the shape of a strong horn-like spine.

Localities. New Zealand and Australia.

S. unilateralis occurs in large close tufts which attain a height of upwards of 6 inches. Each tuft is formed by a multitude of slender filaments carrying closely-set pairs of hydrothecæ along their entire length, and sending off at short intervals equally slender ramuli which are dichotomously branched. These ramuli are entirely confined to one side of the main filament, whose characters they exactly repeat in their slenderness, and in the form and distribution of the hydrothecæ.

The lateral compression of the gonangia causes these to assume a triangular form, the base of the triangle being situated distally, and having its two angles continued into a strong curved horn.

SERTULARIA CRINIS, n. sp. (Pl. XIV. figs. 1, 2.)

Trophosome.—Main stem very slender, monosiphonic, sinuous, subdichotomously branched, carrying along its length short alternately disposed ramuli, which soon subdivide into somewhat flabelliform groups of hydrotheca-bearing ramuli. Hydrothecæ deep, adnate to the internode for about two thirds of their epi-

cauline side, and then diverging at an acute angle; orifice very oblique, directed towards the internode, and with its apocauline edge deeply cleft.

Gonosome.—Gonangia springing each by a short peduncle from the side of the internode at a point just below a pair of hydrothecæ, oboviform, with the summit extended into a short wide tube which opens by a circular orifice.

Locality. Tauranga, New Zealand, collected by Dr. Davies.

Sertularia crinis, though attaining a height of upwards of 7 inches, is a very delicate and flexile species. The chitinous periderm is thin and transparent, and the whole colony is destitute of the rigidity so usual among the Sertularian hydroids. It comes very near to *Sertularia bispinosa*, Gray, from which it differs in its more ovate gonangia without angular processes.

SERTULARIA ELONGATA, Lamx. (Pl. XV. figs. 1-6.)

Trophosome.—Stem slender, monosiphonic, sparingly branched, carrying along nearly its entire length alternately disposed closely-set pinnæ. Hydrothecæ subopposite, carried both by the pinnæ and the main stems, tubuliform, adnate to the internode for about half their height, free and divergent for the remainder, with the summit slightly curved towards the internode; orifice with six long-pointed teeth, the two teeth at the epicauline side of the orifice separated by a wide interval; portion of internode between each pair of hydrothecæ much contracted.

Gonosome.—Gonangia springing each almost exclusively from an internode of the main stem, obconical, smooth, opening on the summit by a slightly elevated rather wide orifice, on each side of which the walls of the gonangium are continued into a long strong horn-like spine.

Locality. Tasmania.

Sertularia elongata is a very elegant plume-like species, attaining a height of about 4 inches, and with much of the habit of a Plumularian. Its tubuliform hydrothecæ with their long marginal teeth, and its large horned gonangia afford obvious and striking characters.

A form from West Australia, differing slightly from that here described, is also contained in Miss Gatty's collection. Its gonangia, instead of being almost exclusively confined to the main stem, are all seated on the pinnæ, each pinna carrying usually a single gonangium. The imperfect partition between the cavity of the hydrotheca and that of the internode is here thick and of

deep brown colour, which contrasts with the lighter and more transparent walls of the hypothecæ and internodes, while its free margin is further thickened into a prominent rim, which in optical section has the appearance of a round knob turned forward, or towards the cavity of the hydrotheca. The orifice of the gonangium is encircled by a line of minute punctæ.

Notwithstanding these differences, I do not regard the distinction as sufficiently marked to justify us in viewing the West-Australian form as specifically distinct from the Tasmanian.

The specimen occurs creeping over the stems of a *Caulinia*, thus indicating a shallow-water habitat. Along this zosteraceous plant its elegant plumes extend for several inches.

SERTULARIA CRINOIDEA, n. sp. (Pl. XVI. figs. 1, 2.)

Trophosome.—Stem simple, springing at short intervals from a creeping stolon, to which it is attached by a short spirally corrugated peduncle. Hydrothecæ adnate to the internode by the entire height of their epicauline side, the apocauline margin of the orifice prolonged divergently upwards and deeply emarginate.

Gonosome not known.

Locality. Cape of Good Hope.

Sertularia crinoidea does not exceed $\frac{1}{10}$ of an inch in height. The prolonged and deeply cleft apocauline margin of the orifice confers on the hydrothecæ of this minute *Sertularia* a form which may be compared to that of a mitre. The internodes are short, and the pairs of hydrothecæ closely approximate. The proximal portion of the stem forms a distinct peduncle, which is surrounded by a few spiral corrugations, and the creeping stolon from which this arises has the inner layers of its walls marked by closely-set transverse constrictions, which in optical section are seen projecting into its cavity.

The very short simple stems are closely set on the creeping stolon, and each carries usually five or six pairs of hydrothecæ. Each internode with its pair of hydrothecæ presents a symmetrical and very elegant outline, and when viewed in the plane common to the two hydrothecæ, recalls the form of the flower in certain lilies.

No gonosome was developed on the specimen, which occurred growing over the surface of a seaweed.

SERTULARIA AMPLECTENS, n. sp. (Pl. XVI. figs. 3, 4.)

Trophosome.—Stems slender, monosiphonic, pinnately branched. Hydrothecæ adnate to the internode for somewhat more than

half their height, then diverging at a very wide angle, and terminating in a deeply-cleft orifice; pairs of hydrothecæ distant; hydrothecæ of each pair closely approximate on the pinnæ, more widely separate on the stem.

Gonosome not known.

Locality. Atlantic, attached to floating gulf-weed.

Sertularia amplexens attains a height of about half an inch. It is a very delicate form, rendered remarkable by the close approximation of the hydrothecæ in each pair on the pinnately disposed branches. The stems from which the pinnæ arise also carry hydrothecæ, but these are here subopposite and less closely approximate, while the joints of the stem are few in number and are situated at uncertain intervals.

Viewed laterally, the approximation of the hydrothecæ, back to back, or by their epicauline sides, resembles the characteristic condition of the hydrothecæ in the genus *Desmoscyphus*. In the present species, however, this approximation is the result of the extent to which the internode is embraced by the hydrothecæ, and instead of being, as in *Desmoscyphus*, confined to one side of the internode, it is equally present on both.

No trace of gonangia can be detected, and the frequent absence of gonosome in such Sertularians as are found on floating forms of *Sargassum* and its usual presence in such as inhabit rooted forms, is, as Miss Gatty has remarked to me, a fact worth noting in connection with the absence of a reproductive system in the floating seaweed and its presence in the rooted one.

SERTULARIA MEGALOCARPA, n. sp. (Pl. XVI. figs. 5-7.)

Trophosome.—Stems simple, attaining a height of about $\frac{1}{10}$ of an inch, springing at short intervals by a spirally twisted proximal extremity, which is destitute of hydrothecæ, from a creeping stolon, which is also spirally twisted; internodes separated from one another by a deep constriction. Hydrothecæ exactly opposite, tubular, adnate to the internode for somewhat more than two thirds of their height, and then becoming free and divergent; orifice with its apocauline margin cleft so as to form two acute teeth.

Gonosome.—Gonangia very large, nearly globular, destitute of annulation, springing by a well-defined peduncle from the side of the proximal hydrotheca-bearing internode just below the base of the hydrothecæ, and opening by a terminal orifice, which is supported by a very short cylindrical neck.

Locality. Australia?

The height of the trophosome in the present species does not exceed $\frac{1}{10}$ of an inch. The enormous size of the gonangia as compared with the minuteness of the trophosome constitutes a striking feature in this diminutive *Sertularia*. The height of the gonangium, exclusive of the peduncle, exceeds the combined length of three internodes of the stem, which here resembles a mere appendage to the gonangium, instead of being, as is usually the case, the most voluminous portion of the colony. Only one gonangium is borne by each stem, and this always springs from the proximal hydrotheca-bearing internode just above the peduncle by which the stem is attached to the creeping stolon.

Sertularia megalocarpa is nearly allied to *S. humilis*, whose large gonangia are quite similar in form and origin to those of the present species. In the narrower hydrothecæ, however, of *S. megalocarpa* and their greater freedom from the supporting internode, a distinction of specific value will be found.

DESMOSCYPHUS.

DESMOSCYPHUS ORIFISSUS, n. sp. (Pl. XVII. figs. 1-4.)

Trophosome.—Hydrocaulus irregularly branched, set with alternate pinnæ; internodes of pinnæ separated by oblique joints, each internode carrying near its middle one, or occasionally two, pairs of hydrothecæ. Hydrothecæ abruptly swollen at the base, where those of each pair are confluent with one another, then tapering to the distal end; aperture deeply cloven.

Gonosome.—Gonangia borne by the main stem, pyriform, with the aperture terminal, wide, and scarcely raised above the surface of the gonangium.

Locality. Bass's Straits.

This is a very striking form. The hydrothecæ of each pair are closely adnate to one another by their swollen bases, while their distal tapering portions, though diverging to the right and left, are all turned to one side. They thus present a unilateral or secund aspect when viewed in profile, while in a front view they appear to be directed to the right and left. The deeply cleft orifice of the hydrotheca is very striking and characteristic. In most cases but a single pair of hydrothecæ is borne on each internode; but occasionally the internode becomes more elongated and carries two. The species comes near to *Sertularia geminata*, Bale, from which it is distinguished by the swollen bases of the hydrothecæ.

The specimen consisted of a piece of about 2 inches long,

broken from the distal end of a colony, and no evidence of the entire height of the colony could be obtained.

DESMOSCYPHUS UNGUICULATA, Busk*. (Pl. XVII. figs. 5-7.)

Trophosome.—Colony consisting of pinnate stems which spring at short intervals from a creeping filiform stolon; pinnæ alternate. Hydrothecæ with the margin of the orifice produced into a long and wide posterior lip and a much shorter and narrower anterior lip; those of the pinnæ adnate to one another by about two thirds of the height of their opposed sides, those of the stem distinct.

Gonosome.—Gonangia springing each from an internode of the stem; oval, with a circular orifice raised on a very narrow collar.

Locality. Adelaide.

I believe that the hydroid here described must be referred to *Sertularia unguiculata*, Busk. The specimen in the collection is apparently an example of a young colony, and attains a height of somewhat more than half an inch. The two lips into which the margin of the hydrotheca is produced bear some resemblance to the mandibles of a bird. Of these lips the posterior is broad and long and terminates in a blunt point, while the anterior, though nearly of the same shape, is very much smaller, and is hidden by the other in the posterior view of the internode. The internodes of the pinnæ are short, and the consecutive pairs of hydrothecæ are here closely approximate. These hydrothecæ lie entirely on the front of the internode, and in each pair are adnate to one another by the greater part of their opposed sides. The hydrothecæ of the stem also lie upon the front aspect of their internode, but here they are quite distinct from one another.

The stem is divided into internodes carrying each a single pinna, which springs alternately from the right and left in consecutive internodes, or else carrying two alternate pinnæ; the latter condition being chiefly that of the internodes near the base of the stem.

While the disposition of the hydrothecæ of the pinnæ is thus quite that of a typical *Desmoscyphus*, the hydrothecæ of the stem more nearly reproduce the characters of *Thuiaria*.

The specimen extends over the surface of a seaweed, which it thickly covers with a diminutive fern-like growth.

The same species has also been described and figured by Bale †,

* Busk, in Voyage of the 'Rattlesnake.'

† Cat. of Australian Hydroid Zoophytes, p. 76.

from whose account it would seem to be a singularly undefined and heteromorphic hydroid, old specimens combining characters of *Sertularia*, *Thuiaria*, *Selaginopsis*, and *Desmoscyphus*.

THUIARIA.

THUIARIA INTERRUPTA, n. sp. (Pl. XVI. figs. 8-10.)

Trophosome.—Stem monosiphonic, carrying pinnately disposed, rather closely-set alternate ramuli. Hydrothecæ borne both by stem and ramuli, nearly opposite, deep flask-shaped, closely set upon the pinnæ in groups of four or five pairs, the groups separated from each other by deep constrictions of the pinna.

Gonosome not present.

Locality. Australia.

This is an easily recognized form, characterized by the distinctly separated groups in which the hydrothecæ are disposed on the pinnæ, and which are quite obvious to the naked eye. The hydrothecæ in each group overlap one another; their margin is thin and collapsable, and it is difficult to obtain from the dried specimen a satisfactory view of it. It would seem, however, to have two small lateral teeth.

The stem is cylindrical, carrying two rows of subopposite, entirely separate hydrothecæ. A narrow, but well-marked joint is present just below the origin of every pinna, and the stem is marked in its entire length by close delicate longitudinal sulci. Each pinna commences by a very short, narrow, cylindrical joint, which is supported by a projecting process of the stem.

The stem attains a height of about 3 inches.

THUIARIA DIAPHANA, *Busk in litteris*, n. sp. (Pl. XVIII. figs. 1-3.)

Trophosome.—Colony attaining a height of 9 inches; stem strongly fascicled towards the base, becoming monosiphonic distally, irregularly branched, and set along its length with close pinnately disposed alternate ramuli. Hydrothecæ alternate, closely set, deep, nearly cylindrical, adnate for their entire height to the internode, and with an even circular orifice, four pairs usually carried on an internode.

Gonosome.—Gonangia carried along one side of the pinnæ, cylindrical, with the summit abruptly truncated, and the margin of the orifice very slightly everted; walls of the gonangium with shallow longitudinal plication.

Locality. Moreton Bay, Queensland.

This beautiful species is remarkable for the delicacy and

transparency of its chitinous periderm and for its large cylindrical plicated gonangia, which in the specimen examined were profusely developed along the upper side of the pinnæ. The contents of the gonangium were always accumulated as an opaque brown mass in the top of its cavity; the plication of its walls was here most distinctly marked, and before reaching the base became obliterated. The species has been examined by Mr. Busk, but not previously described.

THUIARIA RAMOSISSIMA, n. sp. (Pl. XVIII. figs. 4, 5.)

Trophosome.—Hydrocaulus monosiphonic, main stem sending off in every direction branches which are themselves profusely branched; ramification subdichotomous, each bifurcation preceded by a transverse joint. Hydrothecæ alternate, adnate to the hydrocaulus by the whole of their epicauline walls, deep, tubular; the apocauline margin of aperture deeply cleft.

Gonosome.—Gonangia springing each from a point placed laterally just below the base of a hydrotheca; none mature in the specimen.

Locality. North-east coast of America.

The profuse ramification and beautifully plumose disposition of the branches constitute a striking feature in this fine species. In the dried specimen the main stem is brown, while the branches are of a remarkable pale green. The specimen, which is somewhat more than 2 inches in length, has been broken off from the distal end of the colony, and we have no exact data for determining the actual height attained by the species. Some gonangia, too young to allow of the characterization of the mature form, were present in the specimen, where they sprung each from a point just below the base of a hydrotheca.

THUIARIA HIPPISEYANA, n. sp. (Pl. XIX. figs. 1–3.)

Trophosome.—Stem simple, monosiphonic, set with pinnately disposed, opposite, unjointed ramuli along nearly its entire length. Hydrothecæ borne both by stem and pinnæ, deep, nearly cylindrical, adnate to stem and pinnæ for their entire height, alternate and closely set on the pinnæ, nearly opposite and more distant on the stem, marked towards the base with longitudinal undulating and prominent striæ; margin of orifice crenate, and with a deep sinus at its epicauline side.

Gonosome not known.

Locality. Australia.

This is a beautiful and well-marked form. It attains a height

of upwards of 6 inches. Its pinnae are long, exceeding towards the proximal end of the stem an inch in length. They are further remarkable in being opposite instead of alternate, and present the still more exceptional character of being quite destitute of joints. While the hydrothecæ of the pinnae are alternate, those of the stem are opposite, or nearly so, and are more distant than those of the pinnae.

The stem is marked along its entire length by prominent longitudinal parallel striæ, which present a somewhat interrupted or beaded appearance. These striæ are continued along the pinnae, where, however, they are less distinct. From the pinnae they are further continued for some distance along the apocauline side of the hydrothecæ, giving to these when seen in profile a rugose appearance towards the base. The stem differs from the pinnae in presenting a few joints at wide and variable intervals.

THUIARIA HETEROMORPHA, n. sp. (Pl. XX. figs. 1-5.)

Trophosome.—Stems simple, monosiphonic, springing from a plexus of creeping fibres, closely set with regular alternate pinnae, each of which has its proximal internode small, spatuliform, and destitute of hydrothecæ. Internodes of stems carrying each three or four pairs of subopposite hydrothecæ, which are nearly cylindrical, with the orifice destitute of teeth and directed obliquely forward, widely separated from one another transversely, and adnate to the internode by the whole of their posterior side. Hydrothecæ of pinnae opposite but in other respects variable—two, three, or four pairs being borne by an internode in some pinnae, in others only one; hydrothecæ of every pair on some internodes connate to one another by their opposed sides, in others separate.

Gonosome not known.

Locality. Tasmania.

The species here described is full of significance in its bearing on the question of the definitiveness of systematic characters; for the disposition and form of the hydrothecæ vary in different parts of one and the same colony to an extent which, if noticed in separate colonies, would be regarded as affording grounds for generic distinction. In fact the very characters which are here associated do occur separately in other Sertularian hydroids, and have been made the distinguishing marks of no fewer than three genera, *Thuiaria*, *Desmoscyphus*, and *Sertularia*.

The main stem, which attains a height of about an inch and a half, is throughout that of a typical *Thuiaria*, not only in the

great extent to which the hydrothecæ are adnate to the internodes, but in the disposition of the joints by which numerous hydrothecæ are borne on each side of a single internode. The same condition is presented by many of the pinnæ, each internode carrying two or three pairs of hydrothecæ which are quite separate from one another, but adnate in their entire height to the sides of the internode.

In other pinnæ, however, the hydrothecæ of each pair are brought to one side of the supporting internode, and instead of being distinct, are closely approximate and adnate to one another by their opposed sides. This is the essential character of the genus *Desmoscyphus*, which is thus distinguished from *Thuiaria*.

Further, many pinnæ which are typically Thuiarian in their proximal portion, lose all trace of Thuiarian characters towards their distal extremities, and here carry on each internode a single pair of distinct hydrothecæ. These internodes with their hydrothecæ are in every respect those of a typical *Sertularia*. The orifice, moreover, instead of being nearly circular and even and directed away from the supporting internode, as in the other hydrothecæ of the colony, is here directed towards the internode, and has its apocauline margin produced into a sharp, slightly incurved tooth, and the internode with its pair of opposite hydrothecæ has the V-shaped form which is so general among the *Sertulariæ*, the proximal portion rapidly narrowing to its point of union with the internode which precedes it. Indeed, the resemblance of each internode with its pair of hydrothecæ in this part of the colony to those of the *Sertularia operculata* of our own coasts is singularly striking.

Amid systematic characters pointing in so many different directions, it would seem difficult to decide on the true generic position of our Hydroid. It may possibly be urged that this singular combination of characters would justify its reference to an entirely new genus; and, indeed, if we could be sure that the features thus presented were constant, this would perhaps be the proper course to adopt. Until, however, the examination of a greater number of specimens shall afford evidence of the constant recurrence of the same combination of characters, I believe it will be better to refer it to one of the three genera represented by it; and as the characters of *Thuiaria* appear to be predominant, I shall content myself with regarding it simply as a very aberrant species of that genus.

The features here noted in *Thuiaria polymorpha* bring to mind a phenomenon not unknown in the vegetable kingdom; as in the case of certain epiphytical orchids, in which flowers whose difference of form is such as to have caused them to be regarded as characterizing so many distinct genera, are nevertheless found associated in one and the same plant.

THECOCLADIUM, nov. gen.

GENERIC CHARACTER *Trophosome*.—Branching stems set with disjunct hydrothecæ, and jointed at distant and uncertain intervals. Branches having their origin within the hydrothecæ. *Gonosome*.—Gonangia ovate vesicles borne along the stems and branches*.

The genus *Thecocladium* comes near to *Thuiaria*, with which it agrees in the indefinite length of its internodes. It differs from it in the very remarkable origin of the branches which invariably spring from within the hydrothecæ and extend through their orifice.

THECOCLADIUM FLABELLUM, n. sp. (Pl. XIX. figs. 4, 5.)

Trophosome.—Colony composed of several simple or branched monosiphonic stems, which arise at short intervals from a non-adherent stolon. Hydrothecæ alternate, adnate to the stem by somewhat more than three fourths of their epicauline walls, cylindrical, curving gently forwards; orifice entire, margined by a membranous rim; two or three pairs of hydrothecæ borne by an internode.

Gonosome not present.

Locality?

The short, somewhat robust stems, which on the specimen attain a height of about 1 inch, carry deep cylindrical hydrothecæ, slightly turgid at the base. These curve gently forwards, and present a perfectly even circular orifice. The orifice is surrounded by a broad ring-like membranous rim.

A remarkable feature of the present species is the existence of a delicate chitinous annular diaphragm, which intersects the hydrotheca obliquely, passing from about the middle point of the anterior wall downwards and backwards to a point on the posterior wall a little above the base of the hydrotheca. I am

* No gonosome was present in the specimen contained in Miss Gatty's collection; and the character here given is derived from an example of this genus collected during the voyage of the 'Challenger.'

unable to offer any suggestion as to the significance of this very exceptional condition. Its position is nearly that of the intrathecal ridge in the Statoplean Plumularidæ.

AGLAOPHENIA.

AGLAOPHENIA CHALAROCARPA, n. sp. (Pl. XXI. figs. 1-4.)

Trophosome.—Stem monosiphonic, simple, springing from a tubular stolon at such short intervals as to form a dense tuft. Hydrothecæ rather wide, margin with nine teeth; intrathecal ridge distinct, passing quite round the hydrotheca; mesial nematophore adnate to about three fourths of the height of the hydrotheca, and then terminating in a free process which does not extend beyond the level of the hydrotheca-margin; lateral nematophores strong, cylindrical, reaching the level of the hydrotheca-margin.

Gonosome.—Corbula rather short, with about eight pairs of leaflets, which are but slightly adherent to one another, the rhachis carrying a spur-like nematophore at the base of every leaflet; peduncle of corbula carrying a single hydrotheca.

Locality. Cape of Good Hope.

The species here described attains a height of about one inch, and occurs in dense masses along with *Sertularia aperta* on one of the olive-coloured seaweeds, and is probably an inhabitant of quite shallow water. The leaflets of the corbula are either quite free, or slightly adherent to one another by their opposed edges towards the base.

AGLAOPHENIA PERFORATA, n. sp. (Pl. XXI. figs. 5-8.)

Trophosome.—Stem simple, monosiphonic, springing at intervals from a creeping stolon. Hydrothecæ wide, margin with about five teeth on either side, and a single mesial tooth in front; intrathecal ridge strong, transverse, situated at the junction of the middle and posterior third of the hydrotheca; mesial nematophore adnate to about the posterior third of the hydrotheca, and then terminating in a short free process which is separated from the adnate portion by an imperfect septum; lateral nematophores scarcely overtopping the hydrotheca.

Gonosome.—Corbula closed, deep and rather short, with about nine pairs of costæ; sutures of costæ with a wide aperture between every two denticles; peduncle short, carrying a single hydrotheca.

Locality. St. Vincent Islands.

This is a very minute species, not exceeding a fourth of an inch in height. The internodes of the pinnae are easily bent on one another, giving the impression of a movable joint between every two hydrothecae. The corbulæ are disproportionately large for the minute trophosome, and are rendered remarkable by the line of apertures along each suture. These apertures are caused by the imperfect juncture of the sutures, and are so situated that one occurs between every two denticles.

The specimen was found creeping over a piece of gulf-weed.

AGLAOPHENIA ACUTIDENTATA, n. sp. (Pl. XXII. figs. 1-4.)

Trophosome.—Stem irregularly branched, monosiphonic, springing in a crowded tuft from an entangled mass of tubular filaments. Hydrothecae deep, widening from below upwards, margin with nine strongly marked teeth; intrathecal ridge distinct, extending round the walls of the hydrotheca at a short distance above the base; mesial nematophore adnate to the lower two thirds of the hydrotheca, and then continued to the level of the margin as a thick cylindrical process; lateral nematophores ovoid, short and wide, not overtopping the hydrotheca.

Gonosome.—Corbula entirely closed, short and deep, with about nine coalesced costæ, each having a spur-like denticle at its base; the peduncle carrying a single hydrotheca.

Locality?

The present species attains a height of about 2 inches, and differs but little from the typical *Aglaophenia*. It may be known, however, by its deeply-cut hydrotheca-margin and its short thick corbula. Indications of an imperfect septum may be seen in the mesial nematophore near its distal extremity. The denticles of the costæ of the corbula are cup-shaped with emarginate orifice, and exhibit very clearly the relation of these bodies to true nematophores. The spur-like nematophore at the base of each costa is well marked.

AGLAOPHENIA LATE-CARINATA, n. sp. (Pl. XXIII. figs. 5, 6.)

Trophosome.—Stem simple, monosiphonic, springing at intervals from a delicate creeping stolon; pinnae alternate, borne each by a strong process of the stem, the supporting process carrying a strong spine and having a similar spine just below it. Hydrothecae deep, with the margin deeply cleft into eight teeth, the anterior mesial tooth being bifid; a broad keel extending along the front of the hydrotheca from its margin to the mesial nemato-

phore; intrathecal ridge strongly marked, running round the hydrotheca at the junction of its lower and middle third; lateral nematophores not overtopping the hydrotheca; mesial nematophore adnate to somewhat less than the lower third of the hydrotheca, then meeting the keel and ending as a short free process.

Gonosome not known.

Locality. Gulf of Mexico.

The present very minute species, which scarcely exceeds a fourth of an inch in height, was found creeping over gulf-weed. Its strong intrathecal ridge gives to the hydrotheca a decidedly bithalamic character, indicated even externally by a slight constriction at the level of the ridge. The two spine-like processes which lie at the distal end of every pinna are probably modified nematophores. It is nearly allied to the equally minute *Aglaophenia perpusilla* of the United-States Exploration of the Gulf-Stream. It differs, however, from *A. perpusilla* by the greater width of the keel, and by the greater depth of the hydrotheca, and the more strongly marked intrathecal ridge. No gonosome was present in either species.

I have obtained *Aglaophenia late-carinata* from other collections of gulf-weed. It appears indeed to be quite a characteristic form of the hydroid fauna of the floating Sargasso field of the North Atlantic.

AGLAOPHENIA DOLICHOCARPA, n. sp. (Pl. XXIV. figs. 1-4.)

Trophosome.—Stem simple or very sparingly branched, monosiphonic; hydrocladia alternate, closely set, and with short internodes. Hydrothecæ conical, with the margin slightly everted and having four teeth on each side, and one mesial tooth in front; the anterior of the four lateral teeth is strong and furcate, the posterior long and pointed, and the intermediate two teeth short and blunt; intrathecal ridge strong, situated near to the fundus of the hydrotheca; mesial nematophore adnate to the hydrotheca-walls for the entire height of the walls, and with its free terminal portion short and truncate; lateral nematophores wide, scarcely overtopping the hydrotheca.

Gonosome.—Corbula completely closed, very long, cylindrical, composed of about twenty costæ.

Locality. Australia.

The most characteristic feature of this beautiful species, which attains a height of about 6 inches, will be found in the very

long cylindrical corbula. This possesses about twenty costæ, each of which carries about seven denticles and has a short blunt spur at its base. Indications of an intracostal septum may be seen in a broad line which extends in each costa from a point near its base to within a short distance of its summit. The peduncle of the corbula carries two hydrothecæ. Another striking feature consists in the peculiar denticulation of the hydrotheca-margin, with its broad furcate tooth on each side in front, and long pointed tooth behind. The hydrocladial internodes are short, and the hydrothecæ in consequence closely approximated.

HALICORNARIA.

HALICORNARIA MITRATA, n. sp. (Pl. XXII. figs. 5, 6.)

Trophosome.—Stem fascicled, irregularly branched, becoming monosiphonic towards the distal extremities of the branches. Hydrothecæ with a deep constriction in front at a short distance below the margin; margin with a broad angular lobe on each side, and a long, strong, curved, spine-like tooth in front; intrathecal ridge well marked, situated at the junction of the middle and posterior thirds of the hydrotheca-walls; mesial nematophore forming a broad strong process adnate to the hydrotheca as high as the constriction below the margin, and then becoming free and attaining about the height of the distal end of the anterior marginal spine; lateral nematophores strong, cylindrical, attaining the level of the points of the marginal lobes of the hydrothecæ.

Gonosome not known.

Locality?

The present species attains a height of nearly 6 inches. The hydrotheca, with its two-lobed margin and strong anterior spine-like tooth, the deep constriction below the margin, and the very broad and long mesial nematophore afford an assemblage of characters by which this remarkable species may be at once distinguished. It is probably correctly referred to *Halicornaria*, though in the absence of gonosome this determination cannot be regarded as otherwise than provisional.

HALICORNARIA CORNUTA, n. sp. (Pl. XXIII. figs. 1-4.)

Trophosome.—Stem simple, monosiphonic, springing at short intervals from a network of creeping filaments. Hydrothecæ deep, rapidly narrowing towards the base and with the axis directed obliquely forward; margin with two broad, somewhat

everted teeth on each side, and a single long tooth-like process springing from the middle point of the back; mesial nematophore adnate to the hydrotheca-walls for their entire height, then forming a free laterally compressed process which bends upwards at a right angle, carrying on its posterior edge an elevated round orifice, and ending in a long pointed spine; lateral nematophores pyriform, with the upper edge of the orifice continued into a long horn-like spine.

Gonosome not known.

Locality?

This is a very remarkable species. It attains a height of about 4 inches, and is rendered especially striking by its singularly shaped mesial and lateral nematophores. The round orifice, raised on the summit of a papilliform projection of the posterior edge of the mesial nematophore, must, I believe, be regarded as indicating the true summit of the nematophore, its spine-like continuation beyond this point being apparently imperforate. Just below this orifice is a small tooth-like process, which is given off from the nematophore on a level with the margin of the hydrotheca. The lateral nematophores are also continued each into a long slightly curved spine, which gives to the hydrotheca when viewed in front the appearance of being surmounted by two long horns. It is generally, however, only towards the distal extremity of the pinnæ that these horn-like spines can be seen in perfection; near the base of the pinnæ they appear to be stunted or broken off.

In the absence of a gonosome, the reference of this species to *Halicornaria* is provisional.

LYTOCARPUS.

LYTOCARPUS RAMOSUS, n. sp. (Pl. XXV. figs. 1-3.)

Trophosome.—Stem fascicled, much and irregularly branched. Hydrothecæ deep, somewhat ventricose, margin with about nine strong teeth, intrathecal ridge a little below the middle of the hydrotheca; mesial nematophore adnate to about the lower three fourths of the hydrotheca, and then extending as a free strong spine to a level with the margin; lateral nematophores slightly overtopping the hydrotheca.

Gonosome.—Phylactocarps developed at irregular intervals along the branches, and consisting of a rhachis with about thirty-

two alternate costæ; costæ arching over the rhachis from opposite sides, and each carrying several pairs of strong opposite spines.

Locality. Bass's Straits.

This is a tall, strong-growing species, attaining a height of about 9 inches. The pinnae spring very decidedly from the anterior aspect of the branch, each internode of the branch carrying a single pinna directed alternately to the right and left. A large nematophore is borne by each internode just above the origin of the pinna.

The phylactocarps are very beautiful objects. They are formed on the type of the phylactocarps of *Lytocarpus* (*Aglaophenia*) *myriophyllum*. The rhachis is composed of about thirty-two internodes, each internode supporting a single costa, the costæ springing alternately from the right and left sides of the internodes, where each forms a continuation of a short process from the rhachis. To this process it is united by a transverse joint, and besides the pairs of opposite spines it carries near its proximal end a single azygous spine and a pair of short, blunt, closely approximated nematophores. Every internode of the rhachis carries a gonangium, whose point of origin was clearly seen, though the gonangia themselves had all fallen from the specimen.

GATTYA, gen. nov.

GENERIC CHARACTER. *Trophosome*.—Hydrocaulus consisting of hydrocladia which spring from a creeping stolon or from one another through the intervention of a jointed peduncle, and are divided into distinct internodes, each internode carrying a hydrotheca. Hydrothecæ with dentate margin; mesial nematophore fixed, not adnate to the hydrotheca; lateral nematophores moveable. *Gonosome*.—Gonangia destitute of special protective apparatus.

The genus *Gattya* holds a position intermediate between the typical Eleutheroplean and the typical Statoplean forms of the Plumularidæ. To the former it is connected by its moveable lateral nematophores and by the complete separation of the mesial nematophore from the walls of the hydrotheca. To the latter it is connected by its fixed mesial nematophore, and by the dentate margin of the hydrothecæ. Notwithstanding, however, its obvious relations to the Statoplean Plumularidæ, the presence of moveable nematophores must be held as deciding in favour of its place among the Eleutheroplea.

With the genus *Heteroplou* of the 'Challenger' Expedition it has unmistakable relations in the presence of moveable lateral and fixed mesial nematophores, the mesial nematophores being in both genera separated from the hydrotheca. It differs, however, from *Heteroplou* in its dentate hydrotheca-margin in its non-pinnate ramification, and in its pedunculated hydrocladia.

GATTYA HUMILIS, n. sp. (Pl. XXIV. figs. 5-7.)

Trophosome.—Hydrocladia borne along the length of a creeping tubular stolon, from which each springs by a cylindrical jointed peduncle, and occasionally sending off a branch which springs in a similar way from the hydrocladium which carries it; internodes of hydrocladia separated from one another by very distinct joints. Hydrothecæ boat-shaped, adnate to the internode by the whole epicauline wall; aperture with a strong tooth on either side and another in front; no intrathecal ridge; mesial nematophore short, with a wide cup-shaped termination, separated by a short interval from the hydrotheca; lateral nematophores trumpet-shaped, supported on short styloid processes which are given off on a level with the hydrotheca-margin.

Gonosome.—Gonangia pyriform, with broad truncated summit, springing each by a narrow-jointed peduncle from the side of an internode close to the posterior wall of a hydrotheca.

Locality?

Gattya humilis attains a height of about one fourth of an inch, is the only known representative of its genus, and presents an assemblage of characters in the highest degree remarkable and distinctive. The peduncles of the hydrocladia are cylindrical, equalling in length a hydrothecal internode, about the thickness of the stolon from which they spring, and composed of four or five short annular internodes. Each hydrocladium is usually quite simple. It occasionally, however, sends off a branch, which then entirely resembles the hydrocladium from which it springs, and to which it is connected by a jointed peduncle quite similar to that by which the primary hydrocladium is connected to the stolon.

The form of the hydrotheca is very remarkable. It may be roughly compared to that of a boat, the stern of which is adnate to the supporting internode, while the gunwale carries a pointed process on each side, and the bows are projected into a curved beak.

PLUMULARIA.

PLUMULARIA LAGENIFERA, n. sp. (Pl. XXVI. figs. 1-3.)

Trophosome.—Stems simple, springing at very short intervals from a creeping reticulated stolon, each internode giving off a short hydrocladium from alternate sides; hydrocladium with the hydrotheca-bearing internodes separated from one another by several short internodes destitute of hydrothecæ. Hydrothecæ wide and shallow, somewhat ventricose, springing from a point near the middle of the supporting internode, and adnate to the internode by the entire epicauline side; a single mesial nematophore borne by the hydrothecal internode at the proximal side of the hydrotheca and another on one of the intervening internodes.

Gonosome.—Gonangia springing singly from the proximal end of the hydrocladium, oboviform, with the orifice raised on the summit of a tubular neck-like projection, and with the base narrowed into a short peduncle of attachment.

Locality. Vancouver's Island.

Plumularia lagenifera covers the surface of seaweeds with a dense growth of delicate hair-like filaments, which attain a height of about 3 inches.

The specimen was brought by Dr. Harvey from Vancouver's Island.

PLUMULARIA MULTINODA, n. sp. (Pl. XXVI. figs. 4-6.)

Trophosome.—Colony composed of a cluster of delicate simple or very sparingly branched monosiphonic stems, which are divided by transverse joints into rather short internodes, each sending off a hydrocladium from a point close to its distal end; hydrocladia alternate with the hydrothecal internodes, separated from each other by series of usually five short internodes. Hydrothecæ cup-shaped, wide and shallow, situated near the middle of their supporting internodes, to which they are adnate by the whole of their epicauline side; a single mesial nematophore borne by the hydrothecal internode at the proximal side of the hydrotheca, and another on one of the intervening internodes.

Gonosome.—Gonangia springing each from the side of a cladophore, elongated oviform, with the base tapering into a peduncle of attachment, and with the summit tapering towards an even, circular, everted orifice.

Locality. Tauranga, New Zealand.

This delicate *Plumularia* grows in close tufts of fine plumose filaments which may attain a height of about 2 inches. The short internodes by which the long hydrothecal internodes are separated from one another form usually a series of five, of which the middle one is longer than the two at each end of it, these last being reduced to the condition of mere annuli. It is the middle one which carries the nematophore of this part of the hydrocladium. In its shallow and distant hydrothecæ, and in the series of short intercalated internodes the species approaches *Plumularia lagenifera* of the present collection.

DESCRIPTION OF THE PLATES.

PLATE VII.

- Figs. 1, 2. *CAMPANULARIA CARDUELLA*, n. sp.—1. Natural size; the hydroid creeping over a seaweed. 2. Portion of a colony with gonangium; magnified.
- 3, 4. *SERTULARELLA MARGARITACEA*, n. sp.—3. A colony; natural size. 4. Portion of a branch with gonangium; magnified.

PLATE VIII.

- Figs. 1, 3. *SERTULARELLA CAPILLARIS*, n. sp.—1. Natural size. 2. Portion of a branch with gonangium; magnified. 3. A hydrotheca; still further magnified.
- 4, 5. *SERTULARELLA CRASSIPES*, n. sp.—4. Natural size. 5. Portion of a pinna with gonangium; magnified.

PLATE IX.

- Figs. 1, 2. *SERTULARELLA CUNEATA*, n. sp.—1. Natural size. 2. Portion of a pinna with gonangium; magnified.
- 3, 4. *SERTULARELLA LIMBATA*, n. sp. 3. Natural size; creeping over a seaweed. 4. Portion of a colony with gonangium; magnified.

PLATE X.

- Figs. 1, 2. *SERTULARELLA TRIMUCRONATA*, n. sp.—1. A colony; natural size; growing on a seaweed. 2. Portion of pinna with gonangium; magnified.
- 3, 4. *SERTULARELLA TROCHOCARPA*, n. sp.—3. Portion of a colony; natural size. 4. Portion of a pinna with gonangium; magnified.

PLATE XI.

- Figs. 1, 2. *SERTULARELLA DIFFUSA*, n. sp.—1. Natural size. 2. Portion of a colony; magnified.

PLATE XII.

- Figs. 1, 2. *DIPHASIA BIPINNATA*, n. sp.—1. A colony; natural size. 2. Portion of a pinna with female gonangium; magnified.
 3, 4. *SYNTHECIUM RAMOSUM*, n. sp.—3. A colony; natural size. 4. Portion; magnified.

PLATE XIII.

- Figs. 1, 2. *SERTULARIA APERTA*, n. sp.—1. A colony; natural size. 2. Portion; magnified.
 3, 4. *SERTULARIA MINIMA*, D'A. W. Thompson.—3. A colony, natural size, creeping over the surface of a species of *Sargassum*. 4. Portion of a colony with gonangium; magnified.
 5-7. *SERTULARIA UNILATERALIS*, n. sp.—5. Portion of a colony; natural size. 6. Portion, magnified, with origin of a gonangium. 7. Gonangium; magnified.

PLATE XIV.

- Figs. 1, 2. *SERTULARIA CRINIS*, n. sp.—1. Natural size. 2. Portion of a colony with gonangium; magnified.

PLATE XV.

- Figs. 1-6. *SERTULARIA ELONGATA*, Lamx.—1. A colony, natural size; form from Tasmania. 2. Proximal end of a pinna, with origin of gonangium; magnified. 3. Gonangium; magnified. 4. Form from West Australia. 5. Proximal end of pinna, with origin of gonangium; magnified. 6. Gonangium; magnified.

PLATE XVI.

- Figs. 1, 2. *SERTULARIA CRINOIDEA*, n. sp.—1. Natural size, growing over a seaweed. 2. Portion of a colony; magnified.
 3, 4. *SERTULARIA AMPECTENS*, n. sp.—3. Colony, natural size, growing over the surface of floating gulf-weed. 4. Portion of a pinna; magnified.
 5-7. *SERTULARIA MEGALOCARPA*, n. sp.—5. Natural size, growing over a seaweed. 6. Portion of a colony, with gonangium; magnified. 7. Distal portion of hydrotheca; still further magnified.
 8-10. *THUIARIA INTERRUPTA*, n. sp.—8. Colony; natural size. 9. An internode of a pinna; magnified. 10. Portion of stem with origin of two pinnæ; magnified.

PLATE XVII.

- Figs. 1-4. *DESMOSCYPHUS ORIFISSUS*, n. sp.—1. Natural size. 2. Portion of pinna, lateral view; magnified. 3. Portion of pinna, front view; magnified. 4. Gonangium.

Figs. 5-7. *DESMOSCPHUS UNGUICULATA*, Busk.—5. Colony, natural size, growing over a seaweed. 6. Portion of a colony, front view, with gonangium; magnified. 7. An internode carrying a pair of hydrothecæ, back view; magnified.

PLATE XVIII.

Figs. 1-3. *THUIARIA DIAPHANA*, Busk.—Portion of a colony, natural size. 2. Portion of a pinna, front view; magnified. 3. Portion of a pinna, lateral view, with gonangia; magnified.
4, 5. *THUIARIA RAMOSISSIMA*, n. sp.—4. Natural size. 5. Portion of a colony with immature gonangium; magnified.

PLATE XIX.

Figs. 1-3. *THUIARIA HIPPISELYANA*, n. sp.—1. Natural size. 2. Portion of main stem with pinna; magnified. 3. A hydrotheca; still further magnified.
4, 5. *THECOCLADIUM FLABELLUM*, n. gen. et sp.—4. Portion of a colony; natural size. 5. Portion of a colony with origin of a branch from within a hydrotheca; magnified.

PLATE XX.

Figs. 1-5. *THUIARIA HETEROMORPHA*, n. sp.—1. A colony; natural size. 2. Portion of main stem with proximal ends of two pinnæ, front view; magnified. 3. Proximal end of one of these pinnæ, seen in profile. 4. Proximal end of a pinna from another part of the stem. 5. Portion of a pinna from a point near its distal end.

PLATE XXI.

Figs. 1-4. *AGLAOPHENIA CHALACOCARPA*, n. sp.—1. Colony; natural size. 2. Hydrotheca, lateral view; magnified. 3. Hydrotheca, front view; magnified. 4. The corbula; magnified.
5-8. *AGLAOPHENIA PERFORATA*, n. sp.—5. Natural size; growing over a piece of gulf-weed. 6. Portion of a hydrocladium with hydrothecæ; magnified. 7. Corbula; magnified. 8. Portion of suture of two costæ of corbula, showing the apertures between the denticles; still more magnified.

PLATE XXII.

Figs. 1-4. *AGLAOPHENIA ACUTIDENTATA*, n. sp.—1. A colony; natural size. 2. Portion of a hydrocladium with hydrothecæ, lateral view; magnified. 3. Hydrotheca, front view; magnified. 4. Corbula.
5, 6. *HALICORNARIA MITRATA*, n. sp.—5. A colony; natural size. 6. Portion of a hydrocladium with hydrothecæ; magnified.

PLATE XXIII.

- Figs. 1-4. *HALICORNARIA CORNUTA*, n. sp.—1. Natural size. 2. Portion of hydrocladium with hydrothecæ, lateral view; magnified. 3. Same, front view. 4. Same, viewed from behind.
- 5, 6. *AGLAOPHENIA LATE-CARINATA*, n. sp.—5. Natural size, creeping over a piece of gulf-weed. 6. Portion of main stem with proximal end of a hydrocladium; magnified.

PLATE XXIV.

- Figs. 1-4. *AGLAOPHENIA DOLICHOCARPA*, n. sp.—1. Natural size. 2. Internode of hydrocladium with hydrotheca, lateral view; magnified. 3. Same, front view. 4. Corbula; magnified.
- 5-7. *GATTYA HUMILIS*, n. gen. et sp.—5. Natural size, growing over a piece of seaweed. 6. Portion of a colony, showing origin of hydrocladia, from creeping stolon; hydrothecæ seen in profile, with gonangium; magnified. 7. Hydrotheca, front view; magnified.

PLATE XXV.

- Figs. 1-3. *LYTOCARPUS RAMOSUS*, n. sp.—1. Natural size. 2. Portion of a hydrocladium with hydrothecæ; magnified. 3. Portion of a phylactocarp, showing costæ and points from which gonangia arise; magnified.

PLATE XXVI.

- Figs. 1-3. *PLUMULARIA LAGENIFERA*, n. sp.—1. Natural size. 2. Portion of main stem with proximal ends of hydrocladia, and a gonangium; magnified. 3. Portion of a hydrocladium; still further magnified.
- 4-6. *PLUMULARIA MULTINODA*, n. sp.—4. Natural size. 5. Portion of main stem with proximal ends of hydrocladia, and a gonangium; magnified. 6. Portion of a hydrocladium; still further magnified.

On the Anatomy of *Sphærotherium*. By GILBERT C. BOURNE, B.A., New College, Oxford. (Communicated by Prof. MOSELEY, F.R.S., F.L.S.)

[Read 19th November, 1885.]

(PLATES XXVII.—XXIX.)

A SHORT time ago Professor Moseley gave me several specimens of *Sphærotherium*, and pointed out to me the existence of a hitherto undescribed stridulating organ in the males of this genus, to which he refers in the article "Myriapoda" in the 'Encyclopædia Britannica.'

The genus *Sphærotherium* was established by Brandt (Bull. LINN. JOURN.—ZOOLOGY, VOL. XIX. 14



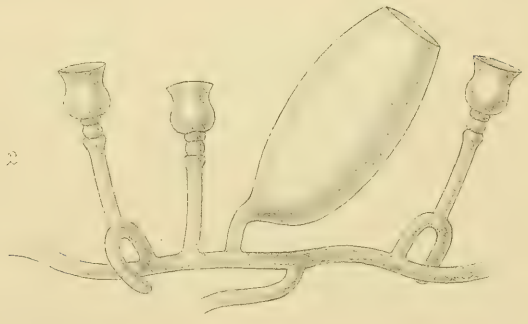
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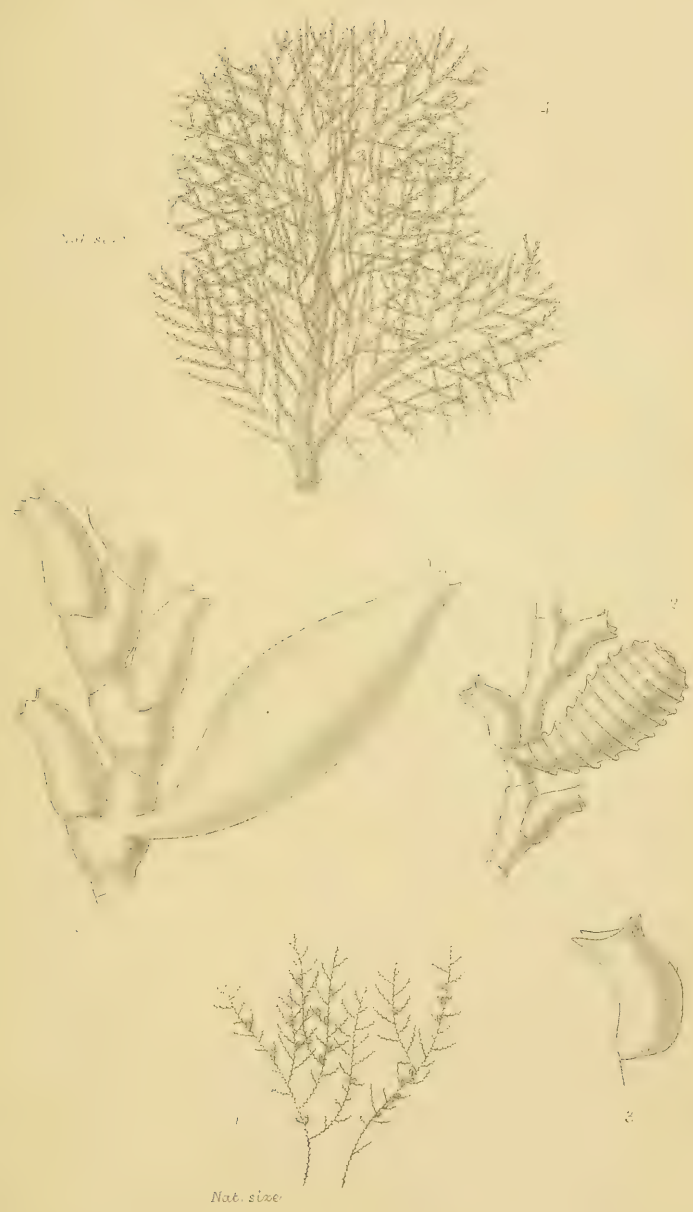
Nat. size.



1-2 CAMPANULARIA CARDUELLA, Allm.
3-4 SERTULARELLA MARGARITACEA, Allm.

West Newman imp

Thomson del.



Nat. size

Nat. size

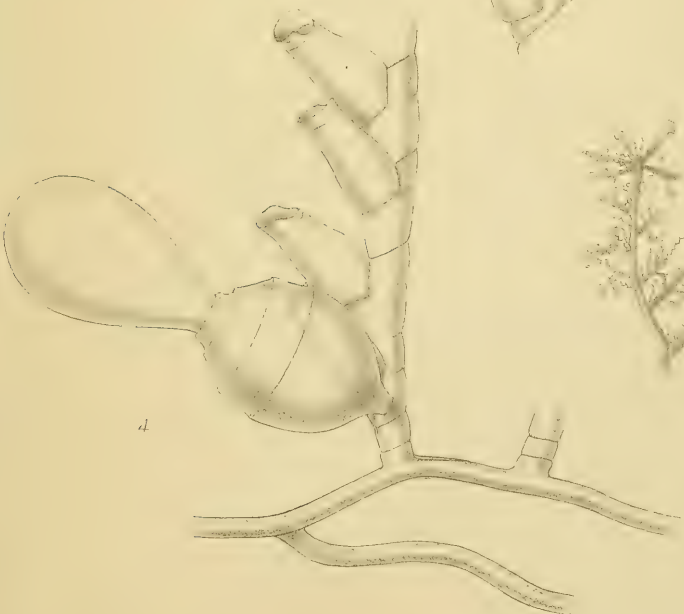
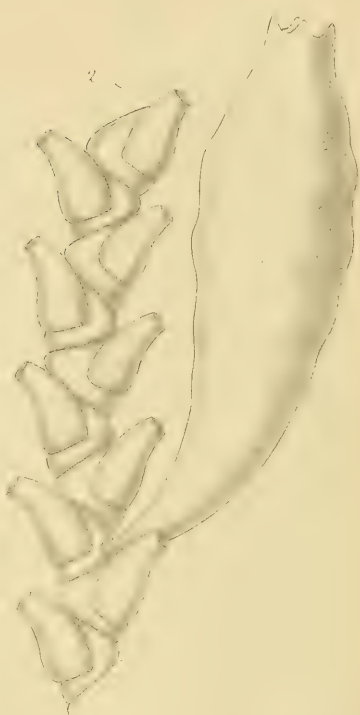
Holck, lith.

West, Newman, imp.

1-3. SERTULARELLA CAPILLARIS, Allat. 4-5. S. CRASSIPES, Allm.



Not size



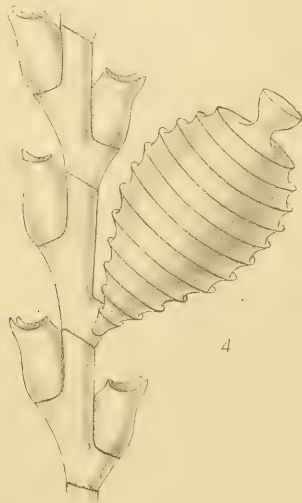
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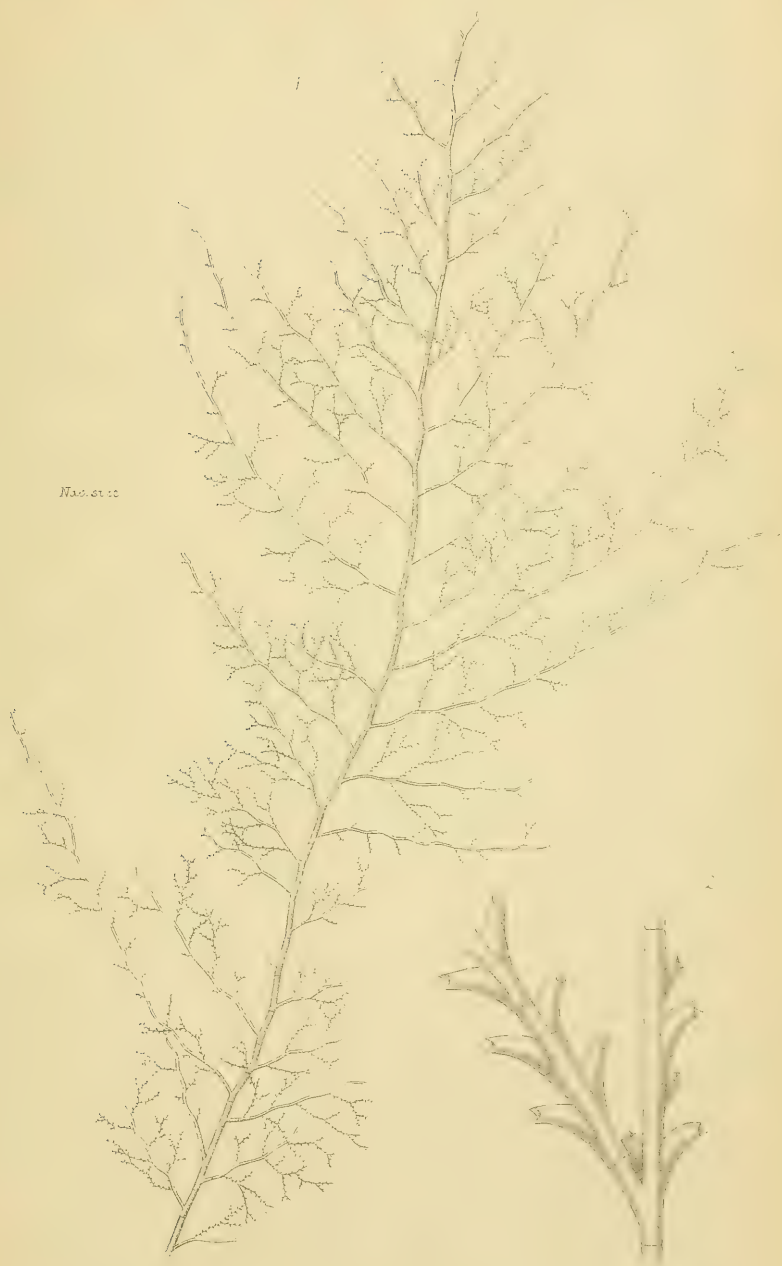


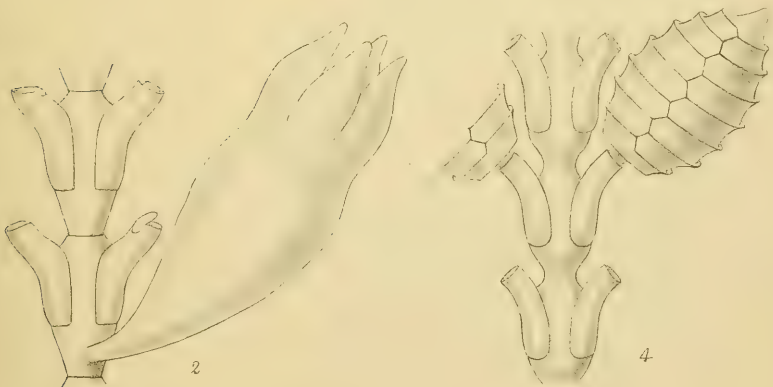
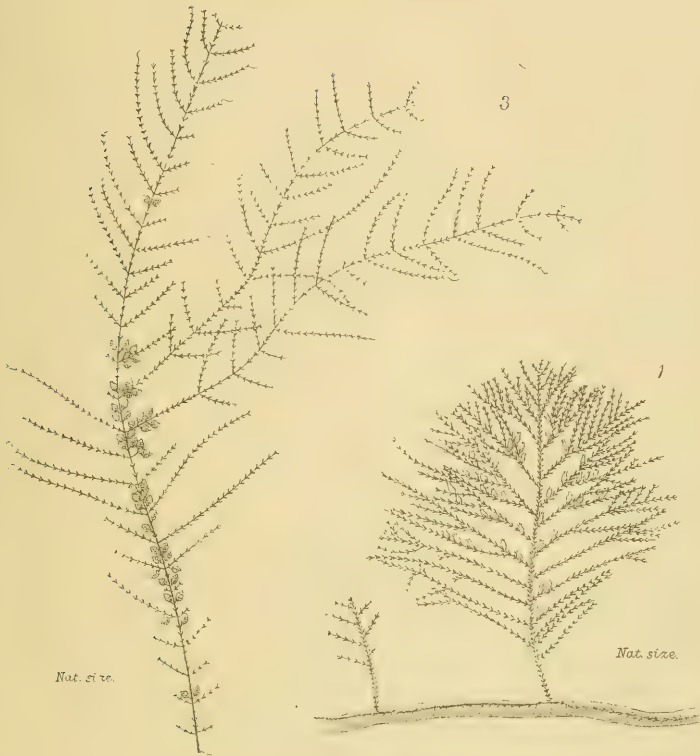
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1-2 SERTULARELLA TRIMUCRONATA Allm.

3-4 S. TROCHOCARPA, Allm.

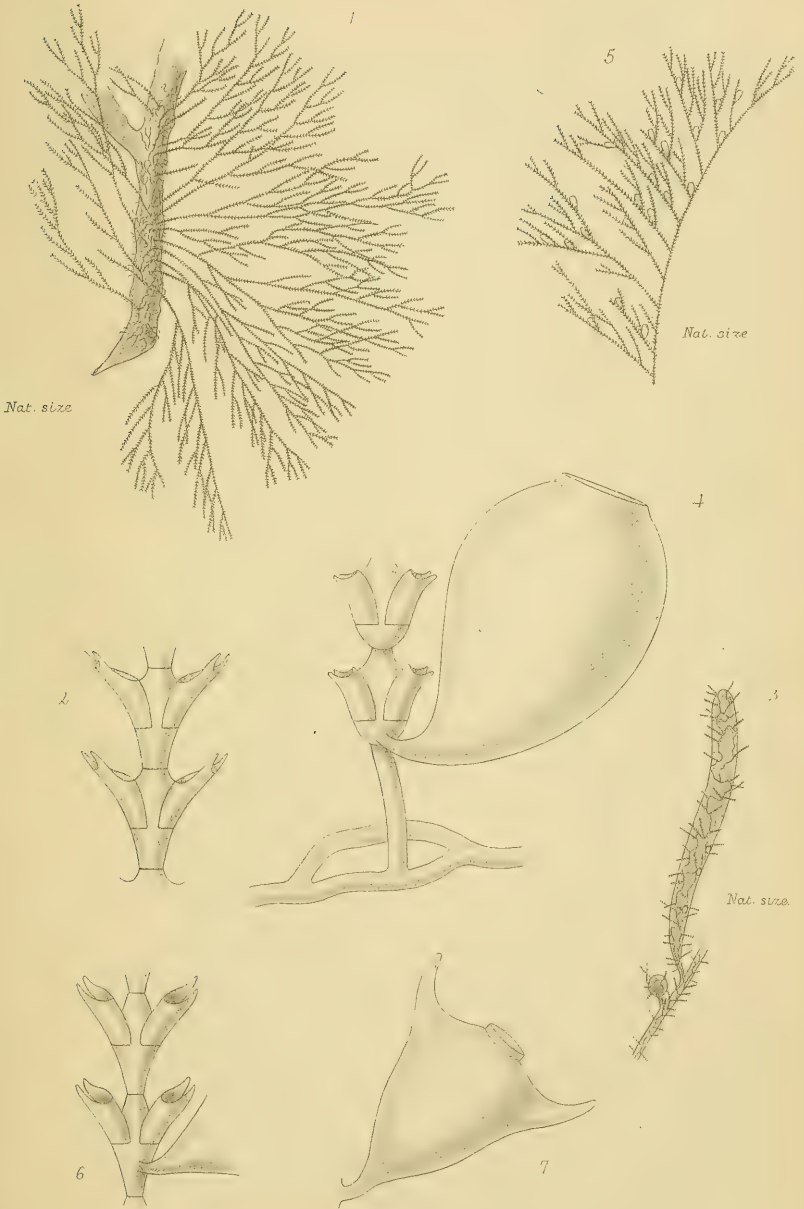
Nat. et. 10





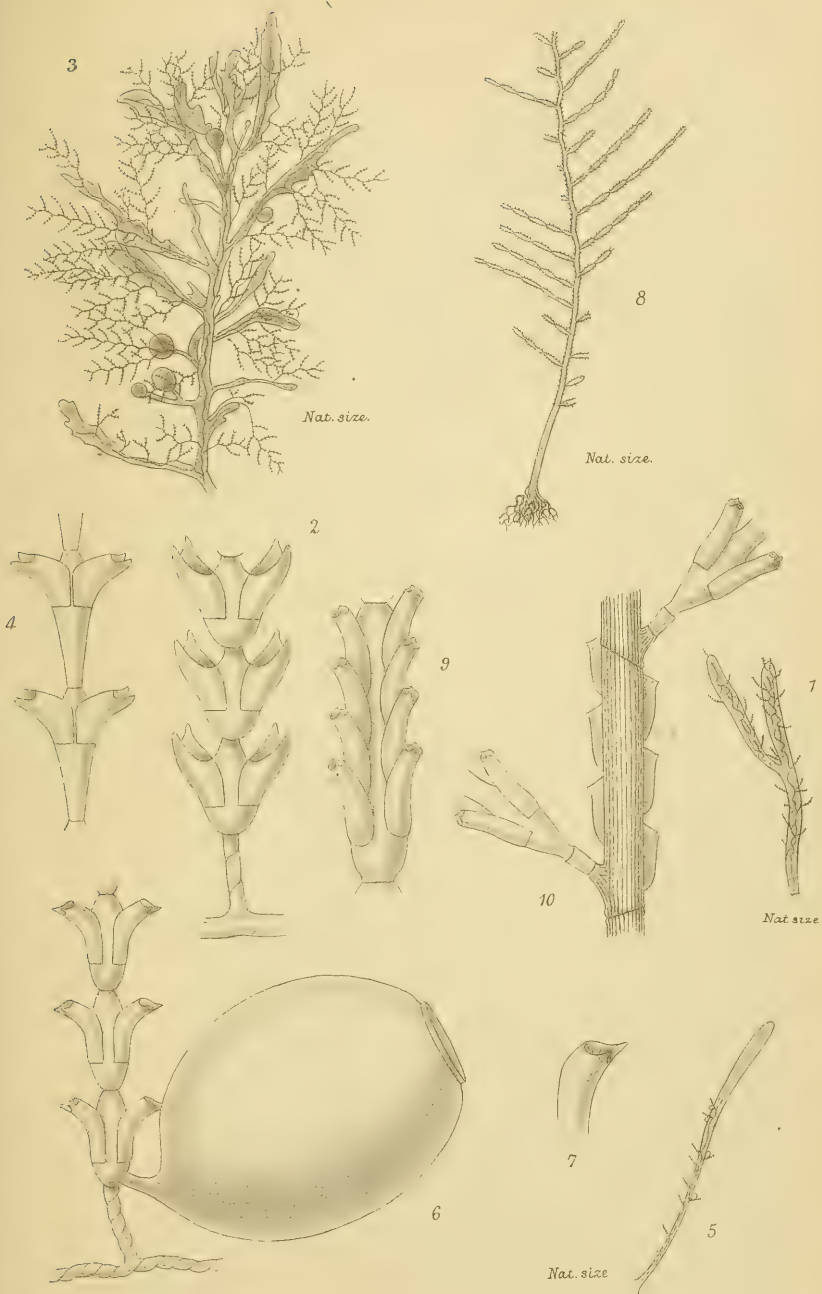
1-2 *DIPHASIA BIPINNATA*, Allm.

3-4 *SYNTHECIUM RAMOSUM*, Allm.





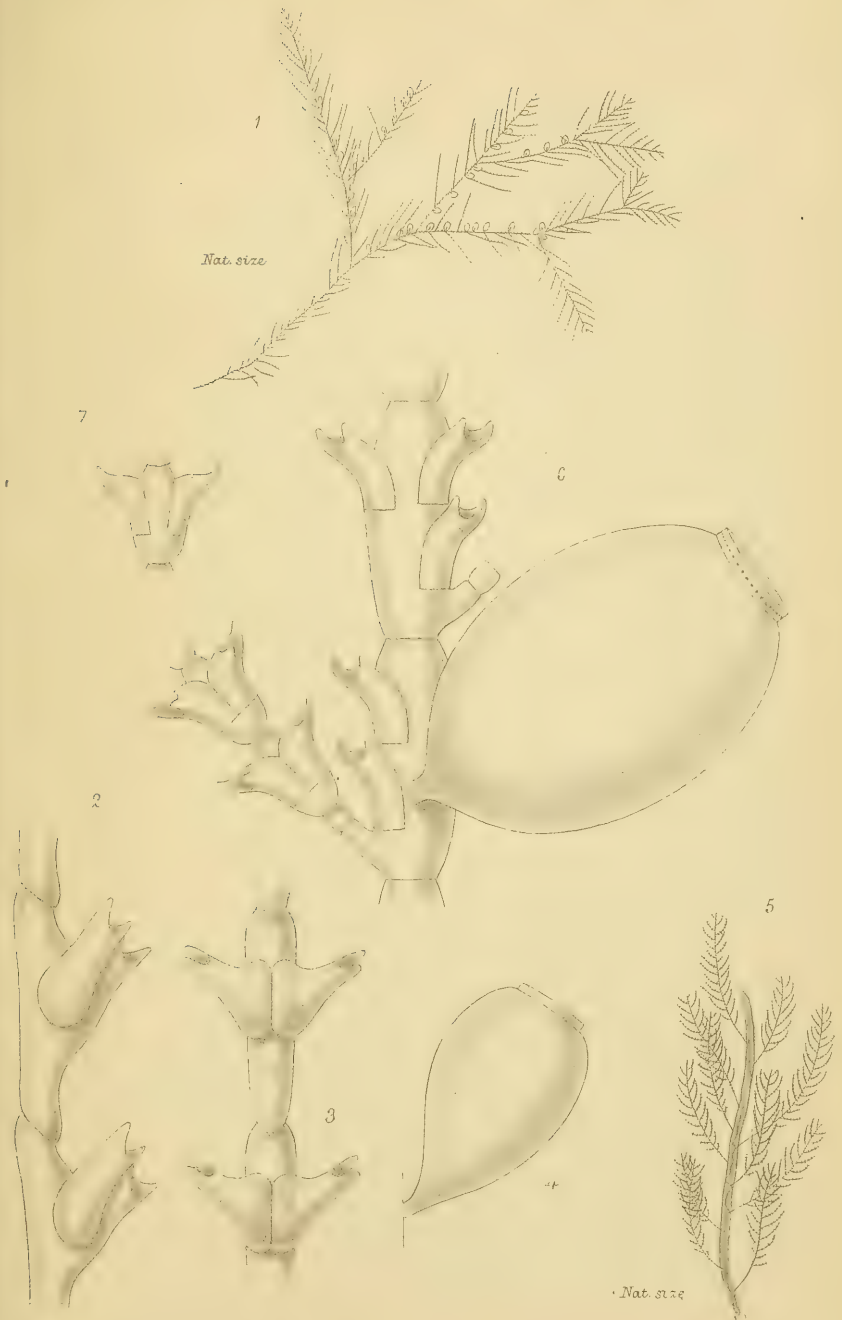




Hollick lith.

West Newman, imp.

1-2 SERTULARIA CRINOIDEA, Allm. 3-4 S. AMPLECTENS, Allm.
 5-7 S. MEGALOCARPA, Allm. 8-10 THUIARIA INTERRUPTA, Allm.



Hollick lith.

West Newman, imp.

1-4 *DESMOSCYPHUS ORIFISSUS* Allm. 5-7 *D. UNGUICULATA*, Busk.

1

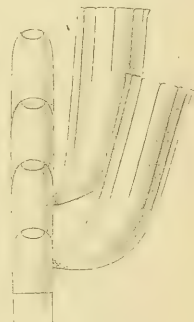


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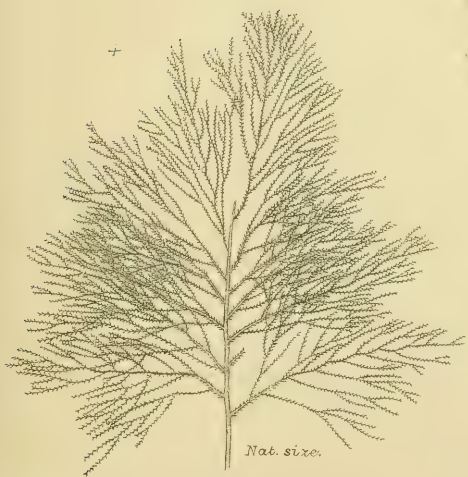
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3



4



Nat. size.

5



Hollick hth.

West Newman inv.

1-3 THUIDIA DIAPHANA, Busk. 4-5 T. RAMOSISSIMA, Altm.



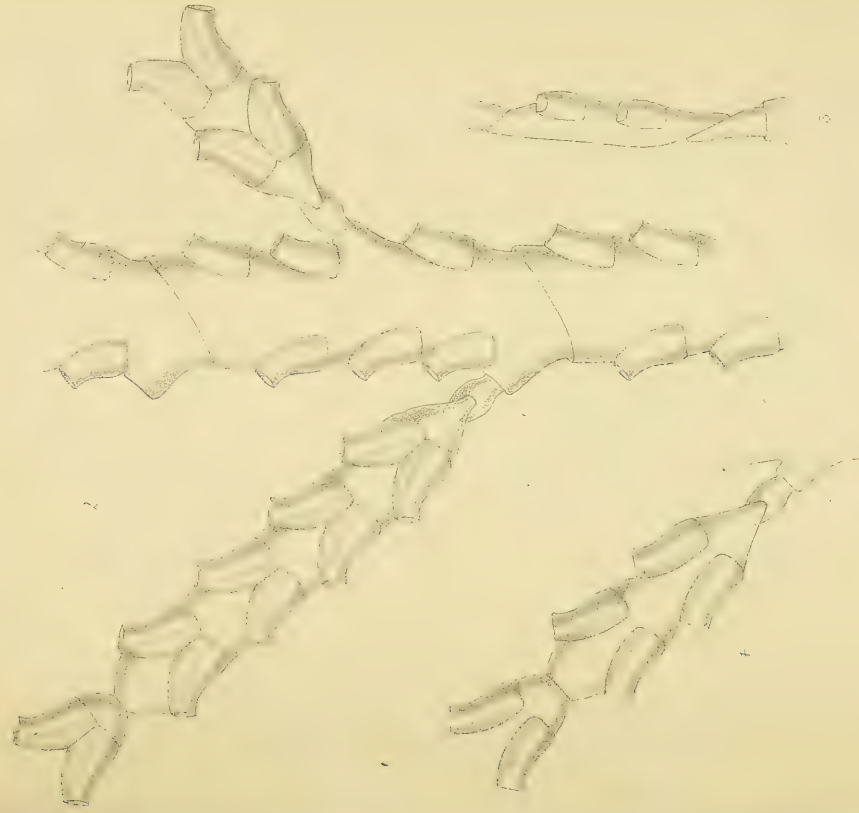
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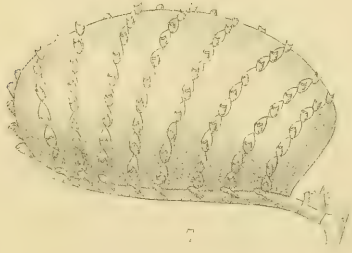
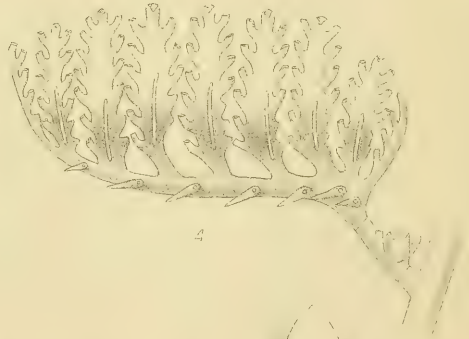
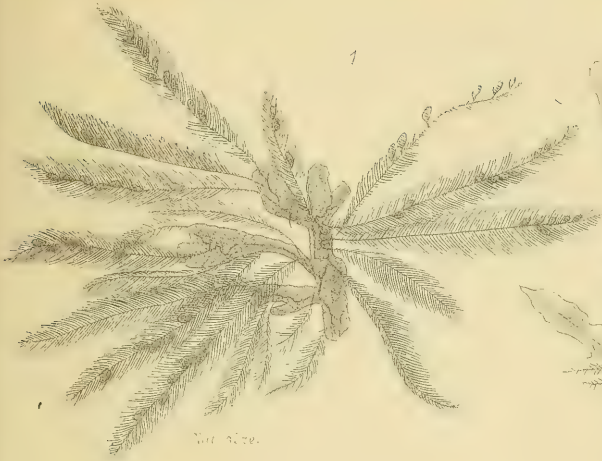
1-3 THUIARIA HIPPISELEYANA, Alm.

4-5 THECOCLADIUM FLABELLUM, Alm.

Hollnax hth.

West Newman, imp.





1-4. AGLAOPHENIA CHALAROCARPA, Allm.

5-8 A. PERFORATA, Allm.

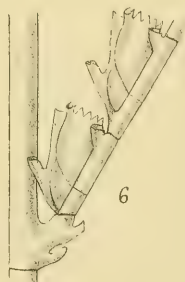
Hollick del.

West Newman, imp.



1-4. AGLAOPHENIA ACUTIDENTATA, Allm.

5-6 HALICORNARIA MITRATA, Allm

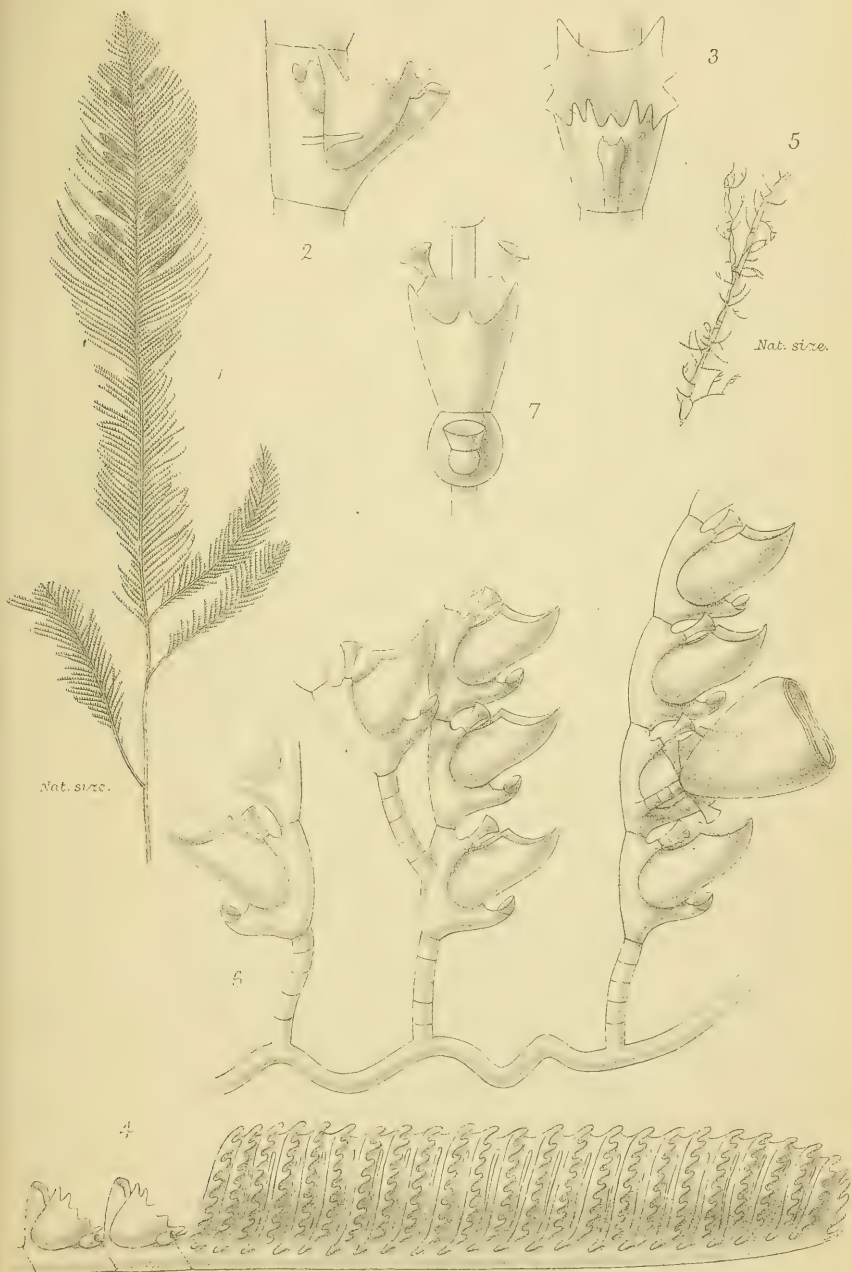


1-4 HALICORNARIA CORNUTA, Allm.

5-6 AGLAOPHENIA LATE-CARINATA, Allm.

Hallick lith.

West Newman, imp.



1-4 AGLAOPHENIA DOLICHOCARPA, Allm.

5-7 GATTYA HUMILIS, Allm.

Went Newmann, imp.

